DEFENSE INFORMATION SYSTEMS AGENCY
JOINT INTEROPERABILITY TEST COMMAND
2001 BRAINARD ROAD
FORT HUACHUCA, ARIZONA 85613-7051

Networks, Transmission and
    Integration Division (JTE)

08 January 2004

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Joint Interoperability Test Certification of Tekelec Eagle Signal
Transfer Point (STP) with Software Release 30.2.0-50.12.0

References: (a)   DOD Directive 4630.5, "Interoperability and Supportability of
Information Technology (IT) and National Security Systems
(NSS)," 11 January 2002

                  (b)   CJCSI 6212.01B, "Interoperability and Supportability of National
Security Systems, and Information Technology Systems," 8 May
2000

1. References (a) and (b) establish the Defense Information Systems Agency, Joint
Interoperability Test Command (JITC), as the responsible organization for interoperability test
certification. Additional references are provided in enclosure 1.

2. The Tekelec Eagle Signal Transfer Point (STP) with Software Release 30.2.0-50.12.0 meets
the critical interoperability requirements for deployment in the Defense Switched Network
(DSN) and is certified for joint use. This certification expires upon changes that affect
interoperability, but no later than three years from the date of this memorandum.

3. This certification is based on testing conducted at the JITC Network Engineering and
Integration Lab, Fort Huachuca, AZ, from 15 September through 31 October 2003. The
Certification Testing Summary in enclosure 2 provides more details about the test, documents
the test results, and describes the test network. Users should verify interoperability before
deploying the Teckelec Eagles in an operational environment that varies significantly from the
test environment.

4. Interoperability certification testing of the Tekelec Eagle consisted of two areas: the STP's
conformance to Signaling System 7 (SS7) standards and the STP's ability to support required
interfaces with associated Exchange Requirements (ERs) specified in reference (c). Testing was
conducted using test procedures in reference (d). The overall system interoperability
performance was derived from test procedures listed in reference (e). Table 1 lists the STP
conformance requirements status and table 2 lists the interface and ER interoperability status.

JITC, Memo, Networks, Transmission and Integration Division (JTE), Joint Interoperability Test Certification of Tekelec Eagle Signal Transfer Point (STP) with Software Release 30.2.0-50.12.0

Table 1. Tekelec Eagle STP Conformance Requirements Status

Conformance Requirement	Reference	Critical	Status
SS7 Network Structure	GSCR Para 6.5.1	Yes	Met
Signaling Link Characteristics	GSCR Para 6.5.2	Yes	Met
Signaling Message Handling, Formats, and Codes	GSCR Paras 6.5.3-5, 6.5.10-11	Yes	Met
Signaling Network Management	GSCR Para 6.5.4	Yes	Met
Error Detection and Recovery	GSCR Para 6.5.2.1	Yes	Met
Signaling Link Congestion	GSCR Para 6.5.4.2	No	Not tested

LEGEND:
GSCR - Generic Switching Center Requirements
SS7   - Signaling System 7
STP   - Signal Transfer Point

Table 2. Tekelec Eagle STP Interface & Exchange Requirements Status

Interface	Exchange Requirement	Critical	Status	Remarks
V.35	SS7 A, B & C-Links IAW GSCR Para 6.5	No[1]	Certified	All critical ERs met
OCU-DP	SS7 A, B & C-Links IAW GSCR Para 6.5	No[1]	Certified	All critical ERs met
DS0A	SS7 A, B & C-Links IAW GSCR Para 6.5	No[1]	Not Tested	
DS1	SS7 A, B & C-Links IAW GSCR Para 6.5	No[1]	Certified	All critical ERs met
E1	SS7 A, B & C-Links IAW GSCR Para 6.5	No	Certified	All critical ERs met

LEGEND:
A-Link - Access Link (SS7)
B-Link - Bridge Link (SS7)
C-Link - Cross Link (SS7)
DS0   - Digital Signal Level Zero: One 64-kbps channel
DS0A   - A process where a sub-rate signal is repeated
        20, 10, or 5 times to make a 64-kbps DS0 channel
DS1   - Digital Signal Level One: 1.544-Mbps North American Transmission
E1   - European Basic Rate (2.048 Mbps)
ER   - Exchange Requirement

GSCR   - Generic Switching Center Requirements
IAW   - In Accordance With
kbps   - kilobits per second
Mbps   - Megabits per second
OCU-DP - Office Channel Unit-Data Port
SS7   - Signaling System 7
STP   - Signal Transfer Point
V.35   - Standard data link interface (56/64 kbps)

Note:
1 Per the GSCR, only one of four STP interfaces is required for certification (V.35, DS0A, DS1, or OCU-DP).

5.   The Tekelec Eagle STP meets all critical conformance requirements. Conformance to signaling link congestion requirements was not tested because the traffic loading resources currently available at the JITC were unable to initiate enough call attempts to overload a signaling link or exceed congestion onset thresholds. This limitation will have a low risk of a significant operational impact within the DSN because the Tekelec Eagle is successfully operating in large commercial SS7 networks with volumes of signaling traffic in excess of what the Department of Defense is expected to generate.

6.   Section 6 of reference (d) requires that STPs provide at least one of the following interface types: V.35, Office Channel Unit-Data Port (OCU-DP), Digital Signal Level Zero A (DS0A), or Digital Signal Level One (DS1). The Tekelec Eagle supports all of these interfaces plus the European basic rate (E1) interface. The V.35, OCU-DP, DS1, and E1 interfaces are planned for

use in the DSN. The DS0A interface was not tested and is therefore not covered by this certification.

7.   JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system and uses unclassified (NIPRNET) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNET at https://stp.fhu.disa.mil/. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNET), or http://199.208.204.125/ (SIPRNET). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi.

8.   The JITC test point of contact is LCDR Michael Wojcik, DSN 879-6787 or commercial (520) 538-6787. The e-mail address is wojcikm@fhu.disa.mil.

FOR THE COMMANDER:

2 Enclosures: LESLIE F. CLAUDIO
1 Additional References   Chief
2 Certification Testing Summary   Networks, Transmission and
                                                          Integration Division

Distribution:
Joint Staff J6I, Room-1E833, Pentagon, Washington, DC 20318-6000
Joint Staff J6E, Room-1E834, Pentagon, Washington, DC 20318-6000
Joint Interoperability Test Command, Washington Operations Division, NSWC, ATTN: JTCA-
    IPTP, Building 900, 101 Strauss Avenue, Indian Head, MD 20640-5035
Defense Information Systems Agency, Interoperability Directorate, Technical Interoperability
    Assessment Branch, ATTN: Code IN11, 5600 Columbia Pike, Suite 240, Falls Church, VA
    22041
Office of Chief of Naval Operations (N612T2), CNO/N6, 2511 Jefferson Davis Hwy, Arlington,
    VA 22202
Headquarters US Air Force, AF/SCTA, 1250 Pentagon, Washington, DC 20330-1250
Department of the Army, Office of the Secretary of the Army, CIO/G6, ATTN: SAIS-IOE-A,
    107 Army Pentagon, Washington, DC 20310-0107
US Marine Corp (C4ISR), MARCORSYSCOM, Suite 315, 2033 Barnett Avenue, Quantico, VA
    22134-5010
DOT&E, Strategic and C3I Systems, 1700 Defense Pentagon, Washington, DC 20301-1700
US Coast Guard, Office of Electronics, 2100 2nd Street SW, Washington, DC 20593
Office of Assistant Secretary of Defense, C3I, 6000 Defense Pentagon, Washington, DC 20301
Office of Under Secretary of Defense, AT&L, Room 3E144, 3070 Defense Pentagon,
    Washington, DC 20301

JITC, Memo, Networks, Transmission and Integration Division (JTE), Joint Interoperability Test Certification of Tekelec Eagle Signal Transfer Point (STP) with Software Release 30.2.0-50.12.0

US Joint Forces Command, J6I, C4 Plans and Policy, 1562 Mitscher Ave, Norfolk, VA 23551-2488

Commander, Defense Information Systems Agency (DISA), ATTN: NS53 (Mr. Osman), Room 5w23, 5275 Leesburg Pike (RTE 7), Falls Church, VA 22041

Additional References

(c)   Defense Information Systems Agency (DISA), Joint Interoperability and Engineering Organization (JIEO), Technical Report 8249, "Defense Information Systems Network (DISN) Circuit Switched Subsystem, Defense Switched Network (DSN) Generic Switching Center Requirements (GSCR)," March 1997

(d)   Joint Interoperability Test Command, "Signaling System 7 Signal Transfer Point Test Plan," July 2001

(e)   Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP)," 17 June 1999

CERTIFICATION TESTING SUMMARY

1.   SYSTEM TITLE. Tekelec Eagle Signal Transfer Point (STP) with Software Release 30.2.0-50.12.0.

2.   PROPONENT. Defense Information Systems Agency.

3.   PROGRAM MANAGER. Mr. Howard Osman, ATTN: NS53, Room 5w23, 5275 Leesburg Pike (RTE 7), Falls Church, VA 22041, e-mail: Osmanh@ncr.disa.mil.

4.   TESTERS. Joint Interoperability Test Command (JITC), Fort Huachuca, AZ.

5.   SYSTEM UNDER TEST DESCRIPTION. STPs are deployed in the Defense Switched Network (DSN) to route signaling messages between Service Switching Points (SSPs). The Tekelec Eagle STP is a standalone STP capable of routing call setup, call control, network management, user-to-network, and user-to-user signaling messages throughout Signaling System 7 (SS7) networks. The STPs also support a broad range of intelligent network services such as Local Number Portability and Calling Name Delivery.

6.   OPERATIONAL ARCHITECTURE. The Tekelec Eagle STP was tested at the JITC Network Engineering and Integration Lab in a manner and configuration similar to that of the DSN SS7 architecture. Tekelec Eagle STPs are currently deployed in Japan, Korea, Hawaii, and Alaska.

7.   REQUIRED SYSTEM INTERFACES. Testing was carried out in accordance with Generic Switching Center Requirements (GSCR), dated March 1997. Table 2-1 lists the STP conformance requirements status and table 2-2 lists the interoperability status for each interface along with associated Exchange Requirements. The GSCR requires that STPs support at least one of the following data link interfaces: V.35, Office Channel Unit-Data Port (OCU-DP), Digital Signal Level Zero A (DS0A), or Digital Signal Level One (DS1). The Tekelec Eagle supports all of these interfaces plus the European basic rate (E1) interface. All of the above mentioned interfaces were tested except for the DS0A interface.

8.   TEST NETWORK DESCRIPTION. The test network configuration depicted in figure 2-1 accurately emulates the DSN SS7 operational environment. The Tekelec Eagle STPs were configured as mated pairs and connected to the Siemens Elektronisches Wahl-System Digital (EWSD) and Lucent Electronic Switching System Number 5 (5ESS) SSPs by A-Links. Three different interfaces were used for the A-Links: DS1, E1, and OCU-DP. The DS1 and E1 links were routed directly from the SSPs to the respective DS1 and E1 interface ports at the STPs. The OCU-DP links provided by the STPs were converted to DS1 by the Premisys IMACS/800 channel bank before connecting to the respective SSPs. Signaling link connectivity to the adjacent STPs and the Nortel Meridian Switching Load (MSL-100) SSP was provided by B-Links. OCU-DP interfaces were used at the Tekelec Eagle STPs for the B-Links and V.35 interfaces

were used at the adjacent STPs. The Premisys IMACS/800 channel bank was used to convert the OCU-DP to DS1 and the N.E.T Promina channel bank was used to convert from DS1 to V.35 at the distant end. The C-Links were configured as V.35 links and directly connected between the mated STP pairs as shown in figure 2-1.

Table 2-1. Eagle STP Conformance Requirements Status

Conformance Requirement	Reference	Critical	Status
SS7 Network Structure	GSCR Para 6.5.1	Yes	Met
Signaling Link Characteristics	GSCR Para 6.5.2	Yes	Met
Signaling Message Handling, Formats, and Codes	GSCR Paras 6.5.3-5, 6.5.10-11	Yes	Met
Signaling Network Management	GSCR Para 6.5.4	Yes	Met
Error Detection and Recovery	GSCR Para 6.5.2.1	Yes	Met
Signaling Link Congestion	GSCR Para 6.5.4.2	No	Not tested

LEGEND:

GSCR - Generic Switching Center Requirements
SS7 - Signaling System 7
STP - Signal Transfer Point

Table 2-2. Eagle STP Interface & Exchange Requirement Status

Interface	Exchange Requirement	Critical	Status
V.35	SS7 A, B & C-Links IAW GSCR Para 6.5	No[1]	Certified
OCU-DP	SS7 A, B & C-Links IAW GSCR Para 6.5	No[1]	Certified
DS0A	SS7 A, B & C-Links IAW GSCR Para 6.5	No[1]	Not tested
DS1	SS7 A, B & C-Links IAW GSCR Para 6.5	No[1]	Certiﬁed
E1	SS7 A, B & C-Links IAW GSCR Para 6.5	No	Certified

LEGEND:
A-Link - Access Link (SS7)
B-Link - Bridge Link (SS7)
C-Link - Cross Link (SS7)
DS0 - Digital Signal Level Zero: One 64-kbps channel
DS0A - A process where a sub-rate signal is repeated
20, 10, or 5 times to make a 64-kbps DS0 channel
DS1 - Digital Signal Level One: 1.544-Mbps North American Transmission
E1 - European Basic Rate (2.048 Mbps)

GSCR - Generic Switching Center Requirements
IAW - In Accordance With
kbps - kilobits per second
Mbps - Megabits per second
OCU-DP - Office Channel Unit-Data Port
SS7 - Signaling System 7
STP - Signal Transfer Point
V.35 - Standard data link interface (56/64 kbps)

Note:
1 Per the GSCR, only one of four STP interfaces is required for certification (V.35, DS0A, DS1, or OCU-DP).
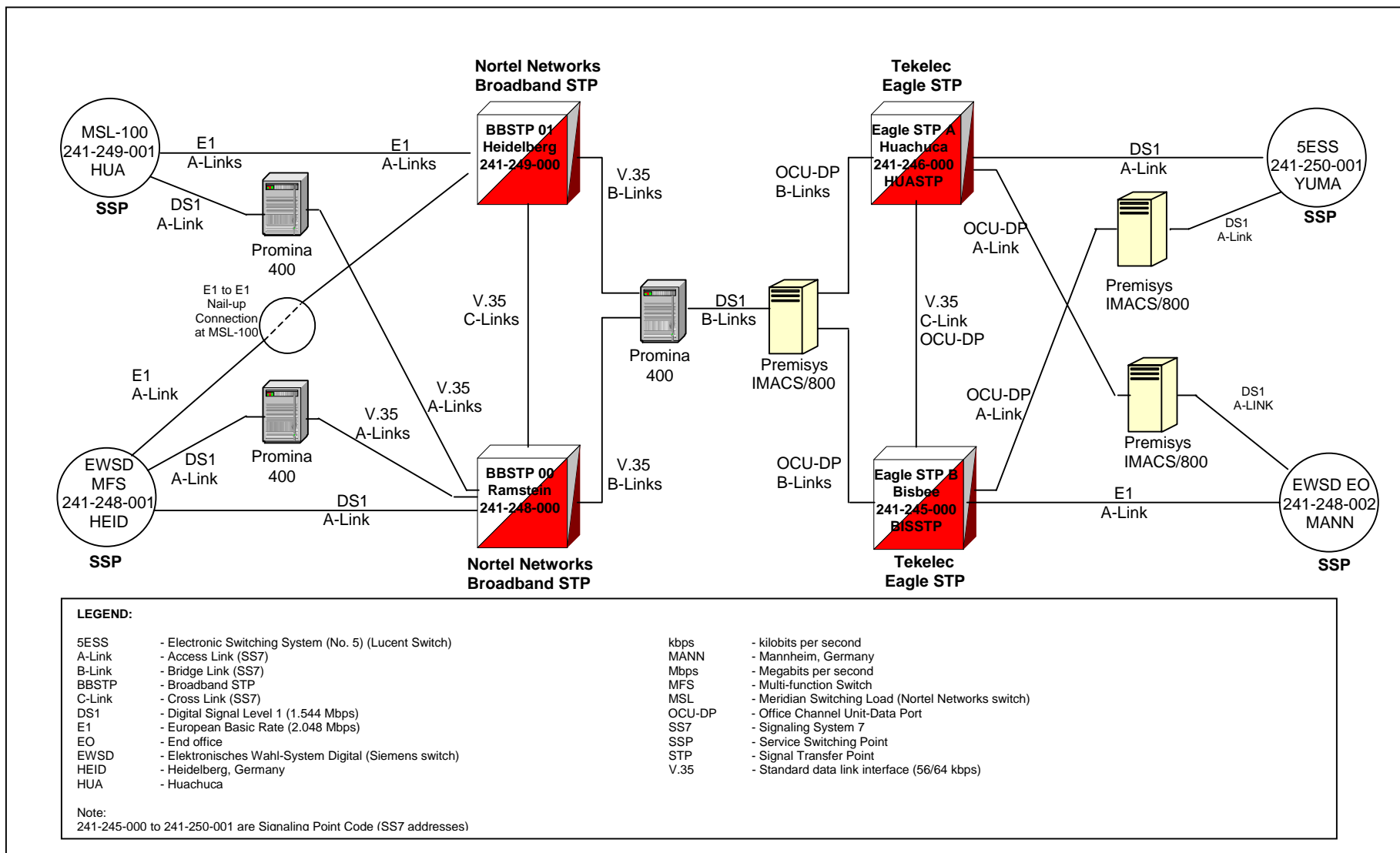
Figure 2-1. Test Network

LEGEND:

5ESS	- Electronic Switching System (No. 5) (Lucent Switch)
A-Link	- Access Link (SS7)
B-Link	- Bridge Link (SS7)
BBSTP	- Broadband STP
C-Link	- Cross Link (SS7)
DS1	- Digital Signal Level 1 (1.544 Mbps)
E1	- European Basic Rate (2.048 Mbps)
EO	- End office
EWSD	- Elektronisches Wahl-System Digital (Siemens switch)
HEID	- Heidelberg, Germany
HUA	- Huachuca

kbps	- kilobits per second
MANN	- Mannheim, Germany
Mbps	- Megabits per second
MFS	- Multi-function Switch
MSL	- Meridian Switching Load (Nortel Networks switch)
OCU-DP	- Office Channel Unit-Data Port
SS7	- Signaling System 7
SSP	- Service Switching Point
STP	- Signal Transfer Point
V.35	- Standard data link interface (56/64 kbps)

Note:
241-245-000 to 241-250-001 are Signaling Point Code (SS7 addresses)

9. SYSTEM CONFIGURATIONS. Table 2-3 lists the hardware and software configurations associated with the components used during the test.

Table 2-3. Tested System Configuration

System Name	Hardware	Software
Tekelec Eagle STP	Eagle Data Packet Switch	Release 30.2.0-50.12.0
Nortel Networks Broadband STP	Signaling Server Platform	Version 8.0.4.38E
Nortel Networks MSL-100 SSP	RISC Processor	MSL-17
Siemens EWSD SSP	CP 113C	Version 19D with patch set 39
Lucent 5ESS SSP	5ESS	5E16.2
Prominia 400	Promina 400	2.04.03
Premisys IMACS/800 Channel Bank	Premisys IMACS/800	Release 3.8.0
Access-T 1500 CSU/DSU	Access-T 1500	087-161E-03C/087-062E-01C

LEGEND:
5ESS   - Electronic Switching System (No. 5)
CP   - Central Processor   RISC   - Reduced Instruction Set Computer
EWSD   - Elektronisches Wahl-System Digital   SSP   - Service Switching Point
MSL   - Meridian Switching Load   STP   - Signal Transfer Point

10. TESTING LIMITATIONS. All interfaces required for initial deployment of the Tekelec Eagle STP were successfully tested in an operationally realistic environment. However, JITC was unable to generate enough voice and signaling traffic to demonstrate compliance with the signaling link congestion control requirements specified in reference (c). This limitation will have a low risk of a significant operational impact within the DSN.   This conclusion was based on call traffic comparisons between a significantly larger commercial SS7 network and the DSN both utilizing a single 56-kilobits-per-second (kbps) signaling link. Due to a limitation of available V.35 interfaces only the C-Link signaling was tested. DS1 and E1 interface testing was also confined to A-signaling links because of limitations on the availability of DS1/E1 interface cards. Since the A-Link, B-Links, and C-Links use the exact same hardware in the Tekelec Eagle STP and pass the exact same protocol messages, there was no operational impact.

11. TEST RESULTS

a. Discussion

(1) Conformance Results. The Tekelec Eagle STP meets all the SS7 STP conformance requirements in accordance with reference (c) using the detailed test critical procedures described in references (d) and (e). Sub-test 6.0 (Signaling Link Congestion) was not tested (refer to paragraph 10). The inability to verify STP and SSP compliance with congestion control requirements will have a low risk of a significant operational impact within the DSN.   This conclusion was based on call traffic

comparisons between a significantly larger commercial SS7 network and the DSN both utilizing a single 56-kbps signaling link. Thus, the signaling link between two DSN SSPs will support the Department of Defense signaling traffic.

(2) Interoperability Results

(a)   Interoperability between the Tekelec Eagle STP and the Nortel Networks MSL-100, Siemens EWSD, and Lucent 5ESS SSPs was successfully tested via the following SS7 signaling link interfaces: A-Links, B-Links, and C-Links. These links were delivered to the Tekelec Eagle STP via DS1, E1, OCU-DP, and V.35 interfaces as shown in figure 2-1. SS7 call setup and control messages were routed to the correct destinations by the STPs and inter-switch calls were completed successfully. Signaling link management functions such as initial alignment, changeover, change-back, and emergency alignment were executed properly by the STPs and SSPs.

(b)   Interoperability between the Tekelec Eagle STP and Nortel Networks BroadBand STP (BBSTP) was also successfully tested via SS7 B-Links as shown in figure 2-1. SS7 call setup, control, and signaling network management messages were successfully routed via between the Tekelec Eagle STP and Nortel Networks BBSTP. The Tekelec Eagle STP performed signaling network management functions in accordance with requirements specified in references (c) and (d).

b.   Summary. The Tekelec Eagle STP with Software Release 30.2.0-50.12.0 meets the interoperability requirements for deployment in DSN and is certified for joint use in accordance with the requirements set forth in references (c) and (d). A summary of test results is listed in table 2-4.

12.   TEST AND ANALYSIS REPORT. No detailed test report was developed per the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system and uses unclassified (NIPRNET) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNET at https://stp.fhu.disa.mil/. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNET), or http://199.208.204.125/ (SIPRNET). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi.

Table 4. Eagle STP Conformance and Interoperability Status

Conformance Status			
Conformance Requirement	**ER/Criteria**	**Critical**	**Status**
SS7 Network Structure	SS7 structure (GSCR Para 6.5.1)	Yes	Met
	Gateway screening (GSCR Para 6.5.1.1)	Yes	Met
Signaling Link Characteristics	SS7 link performance with stored program control switches (GSCR Para 6.5.1, 6.5.2)	Yes	Met
Signaling Message Handling, Formats and Codes	LSSU codes and format (GSCR Para 6.5.3, 6.5.4, 6.5.10)	Yes	Met
	Emergency alignment (GSCR Para 6.5.2, 6.5.4)	Yes	Met
	Message formats (GSCR Para 6.5.10, 6.5.11)	Yes	Met
	Message handling (GSCR Para 6.5.3)	Yes	Met
	SCCP capabilities (GSCR Para 6.5.5)	Yes	Met
	Load sharing (GSCR Para 6.5.3.1)	Yes	Met
Signaling Network Management	Signaling link management (GSCR Para 6.5.4)	Yes	Met
	Signaling route management (GSCR Para 6.5.4)	Yes	Met
Error Detection and Recovery	Basic error detection and recovery (GSCR Para 6.5.2.1)	Yes	Met
	PCR error detection and recovery (GSCR Para 6.5.2.1)	Yes	Met
Signaling Link Congestion	Signaling link congestion (GSCR Para 6.5.4.2)	No	Not tested
V.35, OCU-DP, DS1, and E1	A-Link Signaling	No[1]	Certified
	B-Link Signaling	No[1]	Certified
	C-Link Signaling	No[1]	Certified
DS0A	Same as V.35/OCU-DP	No[1]	Not tested

LEGEND:

A-Link	- Access Link (SS7)	kbps	- kilobits per second
B-Link	- Bridge Link (SS7)	LSSU	- Link Status Signaling Units
C-Link	- Cross Link (SS7)	Mbps	- Megabits per second
DS0	- Digital Signal Level Zero: One 64-kbps channel	OCU-DP	- Office Channel Unit-Data Port
DS0A	- A process where a sub-rate signal is repeated 20, 10, or 5 times to make a 64-kbps DS0 channel	PCR	- Preventive Cyclic Redundancy
		SCCP	- Signaling Connection Control Part
DS1	- Digital Signal Level One: 1.544-Mbps North America Transmission	SS7	- Signaling System 7
E1	- European Basic Rate (2.048 Mbps)	STP	- Signal Transfer Point
ER	- Exchange Requirements	V.35	- Standard data link format (56/64 kbps)
GSCR	- Generic Switching Center Requirements		

Note:
1   Per the GSCR, only one of four STP interfaces is required for certification (V.35, DS0A, DS1, or OCU-DP).